

FORM PTO-1449

INFORMATION DISCLOSURE CITATION IN AN APPLICATION

(Use several sheets if necessary)

5491

Docket Number (Official)
1390.C1/PVD/DVApplication Number
08/851,946Applicant
Nulman et alFiling Date
5/6/97

Group Art Unit

JCS68 U.S. PTO
10/052951
01/17/02

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	DOCUMENT NUMBER							DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
<i>Ym</i>	5	9	6	1	7	9	3	10/5/99	Ngan	204	197.12	
<i>Mm</i>	3	6	1	9	4	0	2	11/9/71	Wurm	204	298.17	

FOREIGN PATENT DOCUMENTS

	DOCUMENT NUMBER							DATE	COUNTRY	CLASS	SUBCLAS S	Translation	
												YES	NO
<i>Mm</i>	9	2	0	7	9	6	9	5/14/92	PCT				

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

AT Search Report issued 11/19/99 in application SI9701437-7

EXAMINER

DATE CONSIDERED

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP § 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to the applicant.

2.22.2000

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JP 668 U.S. PTO
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U.S. PATENT DOCUMENTS

EXAMINER INITIAL	DOCUMENT NUMBER							DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
<i>JS</i>	5	4	6	4	5	1	8	11/7/95	Sieck et al.	204	192.12	
<i>JS</i>	3	5	9	4	3	0	1	7/20/71	Bruch	204	298.26	
<i>JS</i>	5	2	3	4	5	2	9	8/10/93	Johnson	156	345.48	
<i>JS</i>	5	3	6	6	5	8	5	11/22/94	Robertson et al	214	67	
<i>JS</i>	5	5	6	0	7	7	6	10/1/96	Sugai et al	110	723AN	
<i>JS</i>	5	6	3	9	3	5	7	6/17/97	Xu	204	192.3	

FOREIGN PATENT DOCUMENTS

	DOCUMENT NUMBER							DATE	COUNTRY	CLASS	SUBCLASS	Translation	
												YES	NO

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

EXAMINER	<i>Redmond</i>	DATE CONSIDERED	2/21/03
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JP858 U.S. PTO
10/052951
61/17/02

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	DOCUMENT NUMBER							DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
<i>Yh</i>	5	6	9	0	7	8	1	11/25/97	Yoshida et al	156	345.48	
<i>Yh</i>	5	4	3	4	3	5	3	7/18/95	Kraus	174	15.6	

FOREIGN PATENT DOCUMENTS

	DOCUMENT NUMBER							DATE	COUNTRY	CLASS	SUBCLASS	Translation	
												YES	NO
<i>Yh</i>	0	7	2	7	8	0	7	23Jan96	EPO				
	9	5	1	5	6	7	2	8June95	PCT				
	0	6	0	1	5	9	5	10Dec93	EPO				
<i>Yh</i>		8	8	8	1	9	0	2Apr96	Japan				

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

<i>Yh</i>	PCT Search Report issued in Appln PCT/US98/09739

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7/2/03

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U.S. PATENT DOCUMENTS

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FOREIGN PATENT DOCUMENTS

	DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	Translati n	
						YES	NO
<i>pm</i>	7 1 7 6 3 9 8	21May86	Japan (Abstract			X	
<i>pm</i>	63 2 4 6 8 1 4	13Oct88	Japan Abstract			X	

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

<i>pm</i>	U.S. Serial No. 08/857,719 (Atty. Dkt. 1752) ✓
	U.S. Serial No. 08/857,720 (Atty. Dkt. No. 1800) ✓
	U. S. Serial No. 08/857,921 (Atty. Dkt. No. 1737) ✓
	U.S. Serial No. 08/857,944 (Atty. Dkt. 1871) ✓
	U.S. Serial No. 08/907,382 (Atty. Dkt. 1957) ✓
	U.S. Serial No. 08/908,342 (Atty. Dkt. 1620) ✓
	U.S. Serial No. 08/931,170 (Atty. Dkt. 1812) ✓
	U.S. Serial No.08/971,867 (Atty. Dkt. 1957.P1) ✓
	U.S. Serial No. 09/039,695 (Atty. Dkt. 1727) ✓
	U.S. Serial No. 09/049,276 (Atty. Dkt. 938.D2) ✓
<i>pm</i>	U.S. Serial No. 09/049,839 (Atty. Dkt. 938.D1) ✓

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JP868 U.S. PTO

10/052951



U.S. PATENT DOCUMENTS

EXAMINER INITIAL	DOCUMENT NUMBER							DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
<i>Sh</i>	4	3	3	6	1	1	8	6/22/82	Patten et al.	204	192.12	
<i>I</i>	4	6	2	6	3	1	2	12/2/86	Tracy	156	393.44	
	4	6	6	1	2	2	8	4/28/87	Mintz	204	192.25	
	4	8	7	1	4	2	1	10/3/89	Ogle et al.	438	770	
	4	9	4	1	9	1	5	7/17/90	Matsuoka et al.	204	192.12	
	4	9	9	9	0	9	6	3/12/91	Nihei et al.	204	192.3	
	5	1	7	8	7	3	9	1/12/93	Barnes et al.	204	192.12	
	5	4	3	0	3	5	5	7/4/95	Paranjpe	315	111.21	
	5	5	0	3	6	7	6	4/2/96	Shufflebotham et al.	110	723MR	
<i>Sh</i>	5	5	7	3	5	9	5	11/12/96	Dible	118	723MP	

FOREIGN PATENT DOCUMENTS

FOREIGN PATENT DOCUMENTS													
	DOCUMENT NUMBER							DATE	COUNTRY	CLASS	SUBCLASS	Translation	
												YES	NO
<i>Ken</i>	0	6	0	7	7	9	7	1/5/94	EPO				
<i>Jim</i>	59	1	9	0	3	6	3	10/29/84	Japan			X	

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

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FORM PTO-1449 U.S. Department of Commerce
(REV. 7-80) PATENT AND TRADEMARK OFFICE

INFORMATION DISCLOSURE STATEMENT

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Attorney Docket
No.
1390.C1/PVD/DV

Serial No.
08/851,946

Applicant(s)
NULMAN, et al.

Filing Date
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Group

JCE66 U.S. PTO
10/052051



U.S. PATENT DOCUMENTS

Exam. Initial		Document Number							Date	Name	Class	Sub- Class	Filing Date if Appropriate
<i>Ym</i>	AA	5	3	0	4	2	7	9	4/19/94	Coultas et al.	156	345.49	
	AB	5	1	7	5	6	0	8	12/29/92	Nihei et al.	257	751	
	AC	5	1	7	8	7	3	9	1/12/93	Barnes et al.	204	192.12	
	AD	4	7	1	6	4	9	1	12/29/87	Ohno et al.	361	230	
	AE	4	9	1	8	0	3	1	4/17/90	Flamm et al.	438	695	
	AF	4	9	4	8	4	5	8	8/14/90	Ogle	438	729	
	AG	5	3	4	6	5	7	8	9/13/94	Benzing et al.	156	345.48	
	AH	4	8	6	5	7	1	2	9/89	Mintz	204	298.16	
	AI	5	0	6	5	6	9	8	11/91	Koike	118	719	
	AJ	5	1	3	5	6	2	9	8/92	Sawada et al.	204	192.12	
	AK	4	3	6	2	6	3	2	12/82	Jacob	422	186.04	
	AL	5	1	4	6	1	3	7	9/8/92	Gesche et al.	315	111.21	
	AM	4	9	9	0	2	2	9	2/5/91	Campbell et al.	204	298.06	
	AN	4	8	4	4	7	7	5	7/4/89	Keeble	216	68	
	AO	5	4	3	0	3	5	5	7/4/95	Paranjpe	315	111.21	
	AP	5	4	2	9	9	9	5	7/4/95	Nishiyama et al.	438	788	
	AQ	5	4	2	9	7	1	0	7/4/95	Akiba et al.	438	714	
	AR	5	4	2	9	0	7	0	7/4/95	Campbell et al.	119	171	
	AS	5	4	2	1	8	9	1	6/6/95	Campbell et al.	118	723R	
	AT	5	4	1	8	4	3	1	5/23/95	Williamson et al.	315	111.51	
	AU	5	3	9	7	9	6	2	3/14/95	Moslehi	315	111.51	
	AV	5	3	6	8	6	8	5	11/29/94	Kumihashi et al.	216	70	
	AW	5	3	6	6	5	9	0	11/22/94	Kadomura	438	723	
	AX	5	3	6	1	0	1	6	11/1/94	Ohkawa et al.	315	111.41	
<i>Ym</i>	AY	5	3	1	2	7	1	7	5/17/94	Sachdev et al.	438	313	

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Group

<i>Mr</i>	AZ	5	2	8	0	1	5	4	1/18/94	Cuomo et al.	219	121.52	
	BA	5	2	3	1	3	3	4	7/27/93	Paranjpe	315	111.21	
	BB	5	2	2	5	7	4	0	7/6/93	Ohkawa	315	111.41	
	BC	5	2	0	6	5	1	6	4/27/93	Keller et al.	250	492.2	
	BD	5	1	2	2	2	5	1	6/16/92	Campbell et al.	204	298.06	
	BE	5	0	9	1	0	4	9	2/25/92	Campbell et al.	206	37	
	BF	4	9	2	5	5	4	2	5/15/90	Kidd	427	531	
	BG	4	7	9	2	7	3	2	12/88	O'Loughlin	315	334	
	BH	5	2	4	1	2	4	5	8/93	Barnes et al.	315	111.41	
	BI	5	4	0	4	0	7	9	4/95	Ohkuni et al.	315	111.01	
	BJ	5	2	3	4	5	6	0	8/10/93	Kadlec et al.	204	192.12	
	BK	4	8	4	2	7	0	3	6/89	Class et al.	204	192.12	
	BL	5	4	0	1	3	5	0	3/28/95	Patrick et al.	156	345.48	
<i>Mr</i>													

FOREIGN PATENT DOCUMENTS

		Document Number							Date	Country	Class	Sub-Class	Abstract	
													Yes	No
<i>Mr</i>	CA	0	5	2	0	5	1	9	12/10/92	EPO				
	CB	2	2	3	1	1	9	7	11/7/90	U.K.				
	CC	2	1	6	2	3	6	5	1/29/86	U.K.				
	CD	WO	8	6	0	6	2	3	11/20/86	PCT				
	CE	61	1	9	0	0	7	0	8/86	Japan (Abstract)				
	CF	6	2	8	3	4	7	0	10/7/94	Japan				
	CG	6	2	3	2	0	5	5	8/19/94	Japan				
	CH	7	1	7	6	3	9	9	7/14/95	Japan (Abstract)				
	CI	7	1	7	6	3	9	8	7/14/95	Japan (Abstract)				
<i>Mr</i>	CJ	8	1	5	3	7	1	2	6/11/96	Japan				

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<i>the</i>	CK	8	2	8	8	2	5	9	11/1/96	Japan			

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

<i>the</i>	DA	M. Yamashita, "Sputter Type High Frequency Ion Source for Ion Beam Deposition Apparatus," <i>Jap. J. Appl. Phys.</i> , vol. 26, pp. 721-727, 1987
	DB	M. Yamashita, "Fundamental Characteristics of Built-in High Frequency Coil Type Sputtering Apparatus," <i>J. Vac. Sci. Technol.</i> , vol. A7, pp. 151-158, 1989
	DC	S.M. Rossnagel et al., "Metal Ion Deposition from Ionized Magnetron Sputtering Discharge," <i>J. Vac. Sci. Technol.</i> , vol. B12, pp. 449-453, 1994
	DD	S.M. Rossnagel et al., "Magnetron Sputter Deposition with High Levels of Metal Ionization," <i>Appl. Phys. Lett.</i> , vol. 63, pp. 3285-3287, 1993
	DE	S.M. Rossnagel, et al., "Filling Dual Damascene Interconnect Structures with AlCu and Cu Using Ionized Magnetron Deposition," <i>J. Vac. Sci. Technol.</i> , vol. B13, pp. 125-129, 1995
	DF	Y-W. Kim et al., "Ionized Sputter Deposition of AlCu: Film Microstructure and Chemistry," <i>J. Vac. Sci. Technol.</i> , vol. A12, pp. 3169-3175, 1994
	DG	J. Hopwood et al., "Mechanisms for Highly Ionized Magnetron Sputtering," <i>J. Appl. Phys.</i> , vol. 78, pp. 758-765, 1995
	DH	P. Kidd, "A Magnetically Confined and ECR Heated Plasma Machine for Coating and Ion Surface Modification Use," <i>J. Vac. Sci. Technol.</i> , vol. A9, pp. 466-473, 1991
	DI	W.M. Holber, et al., "Copper Deposition by Electron Cyclotron Resonance Plasma," <i>J. Vac. Sci. Technol.</i> , vol. A11, pp. 2903-2910, 1993
	DJ	S.M. Rossnagel, "Directional and Ionized Sputter Deposition for Microelectronics Applications," <i>Proc. of 3rd ISSP (Tokyo)</i> , pp. 253-260, 1995
	DK	M. Matsuoka et al., "Dense Plasma Production and Film Deposition by New High-Rate Sputtering Using an Electric Mirror," <i>J. Vac. Sci. Technol.</i> , A 7 (4), 2652-2657, Jul/Aug 1989
	DL	U.S. patent application serial No. 08/680,335, filed 7/10/96 (Atty. Dk. 1390-CIP/PVD/DV)
	DM	N. Jiwari et al., "Helicon wave plasma reactor employing single-loop antenna," <i>J. of Vac. Sci. Technol.</i> , A 12(4), pp. 1322-1327, Jul/Aug 1994
	DN	Search report dated 2/27/97, EPC application No. 96308251.6
	DO	U.S. patent application serial No. 08/677,588, filed July 9, 1996 (Atty. Dk. 1402/PVD/DV)
	DP	U.S. patent application serial No. 08/644,096, filed 5/10/96 (Atty. Dk. 1390/PVD/DV)
<i>the</i>	DQ	U.S. patent application serial No. 08/647,184, filed 5/9/96 (Atty. Dk. 1383/PVD/DV)

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<i>dy</i>	DR	U.S. patent application serial No. 07/954,860, filed 9/30/92 (Atty. Dk. 364)
	DS	U.S. patent application serial No. 08/461,575, filed 9/30/92 (Atty. Dk. 364.F1)
	DT	U.S. patent application serial No. 08/310,617, filed 9/30/92 (Atty. Dk. 364.P1)
	DU	U.S. patent application serial No. 08/567,601, filed 6/2/95 (Atty. Dk. 364.P2)
	DV	U.S. patent application serial No. 08/647,182, filed 5/9/96 (Atty. Dk. 1186)
	DW	U.S. patent application serial No. 08/559,345, filed November 15, 1995 (Atty. Dk. 938/PVD/DV)
	DX	U.S. patent application serial No. 08/733,620, filed 10/17/96 (Attorney Docket # 1457/PVD/DV)
	DY	U.S. patent application serial No. 08/741,708, filed 10/31/96 (Attorney Docket # 1590/PVD/DV)
	DAA	U.S. patent application serial No. 08/846,335, filed 5/14/97 (Atty. Dk. 1736/PVD/DV)
	DAB	U.S. patent application serial No. 08/853,024, filed 5/8/97 (Atty. Dk. 1186.P1/PVD/DV)
	DAC	U.S. patent application serial No. 08/857,719, filed 5/16/97 (Atty. Dk. 1752/PVD/DV)
<i>m</i>	DAD	U.S. patent application serial No. 08/559,345, filed 11/15/97 (Atty. Dk. 938)

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